Reciprocity

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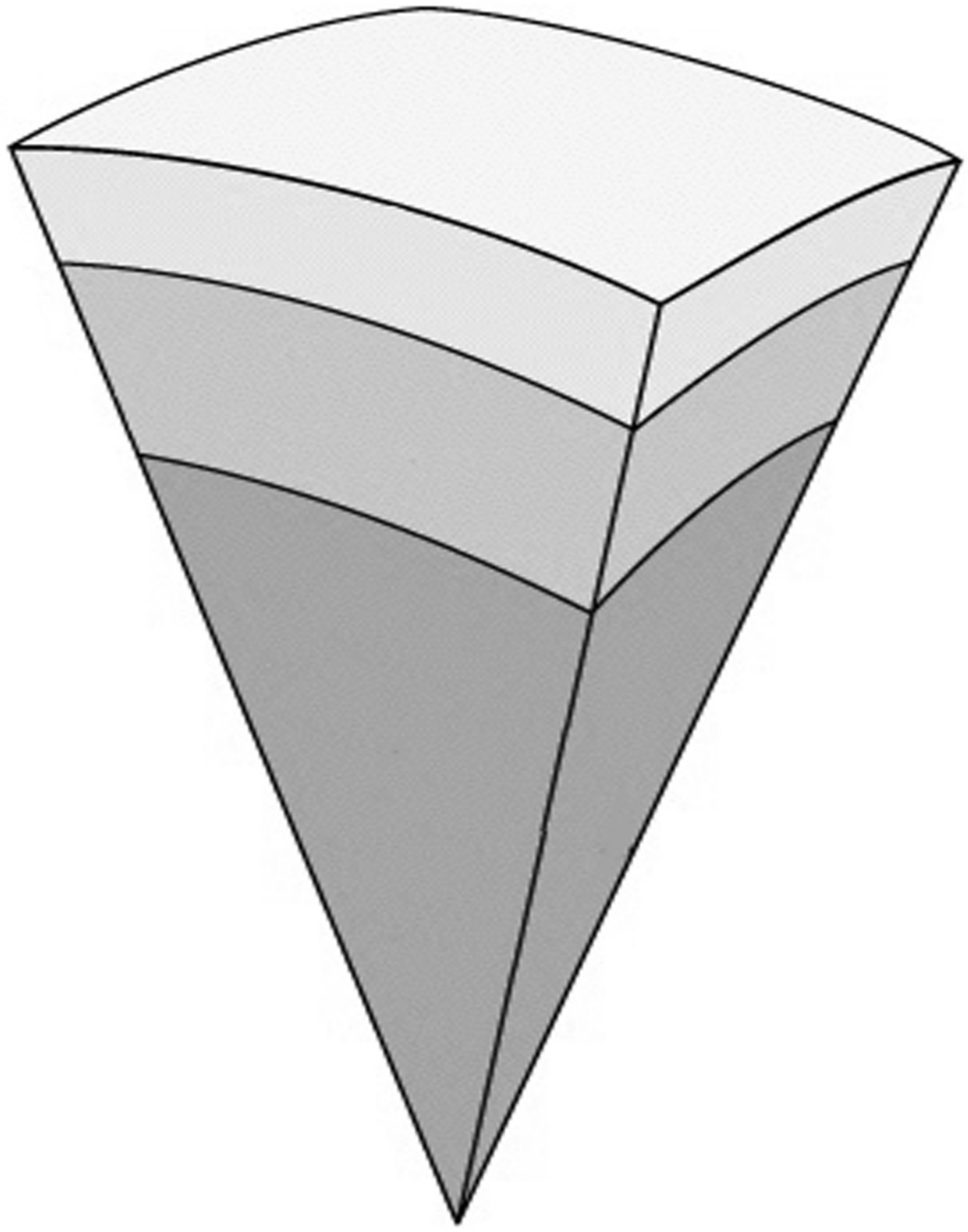

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SIXTH ANNUAL NSA,INC. CONVENTION PROGRAM

ROCKWELL INTERNATIONAL DOWNEY FACILITY
12214 Lakewood Boulevard
Los Angeles(Downey), CA 90241
Friday & Saturday
August 14-15,1981
9,00A.M.-- 5.00P.M.

SIXTH CONVENTION TO HONOR AUTHOR OF RECIPROCAL SYSTEM OF PHYSICS

Prospects for promoting the Reciprocal System of physical theory at our 1981 Convention are bright,if we supporters of Dewey B, Larson's creation work for it to survive and prevail. In the existing world of our earth,where a Space Shuttle has just been launched,new and unending avenues of exploration and inquiry are opening,even as happened before.

The SIXTH NSA CONVENTION intends to honor Dewey Larson for initiating and greatly contributing to the contemporary Renaissance in the physical sciences.We shall do this by tendering him and his lovely wife,Dorothy, an honorarium at our meeting.Every NSA member and supporter of our movement is asked to contribute $10 or more to this purpose. Please send your contribution to Dr. Rainer Huck,NSA Treasurer,address on RECIPROCITY masthead.

D.B.Larson's creation and development of the Reciprocal System is the basis of seeing the physical universe clearly as an unbroken WHOLE, a unity of motion. This rational conception of our world of space and time makes an end of the existing order of physical theory that fragments and fractures the oneness of the physical universe,portraying it as a realm of altogether self-existent,unconnected and completed things & elementary particles of static and inertial matter.

Nature's Frame of Reference,discovered by D.B.Larson and adopted by his Reciprocal System of theory,is the three-dimensional space-time progression. For simplifying physics this Frame is preferable to and should replace the reference frame which has been for centuries the basic frame used in physics,the Cartesian rectilinear grid(slightly modified in the Einsteinian theory of relativity to a curvilinear grid).

As pointed out by Prof. David Bohm,"The Cartesian order is suitable for analysis of the world into separately existent parts(e.g. particles or field elements).....we look into the nature of order with greater generality and depth and discover that both in relativity and quantum theory,the Cartesian order is leading to serious contradictions and confusions." (D.Bohm,Wholeness and the implicate order,p.xv, Routledge & Regan Paul,1980)

CONVENTION NOTE

Dr. Rainer Huck did so fine a job as Program Chairman at the 1980 Huntsville Convention that he had to be requested to serve again in 1981 and he has kindly consented.

If you wish to present a paper on your recent exploration of the Reciprocal System at the Downey Convention,and have not notified Rainer, you may still have a chance for time on the program,provided that you send notice of title to him promptly.

As RECIPROCITY goes to press, Editors may not have up-to-date list of papers to be presented. Some papers,we have learned,that have been entered and accepted and are schuduled to be presented are:

Dr. K.V.K. Nehru, India, "Neutron Lifetime"
David Halprin, Australia, "Intrinsicality"
Ronald W. Satz, "Photoionization and Photomagnetization"
Dr. Elizabeth A. Rauscher,"Physical Models of Remote Connections"
Dr. Ron Blackburn,"Some Allies of the Reciprocal System"

Mr. Larson's Principal Address will be delivered inthe Kona Kai Room of the Tahitian Village Motel,Friday,August 14, 8.00P.M.,after Dinner. Price of Dinner is $10,including taxand tip. Please make your dinner reservations with Mark Weissman,Convention Host,see below.

NSA has reserved over-night accomodations for those who will need them,at Tahitian Village Motel,13535 Lakewood Boulevard at Rosecrans, Downey,CA90242,single occupanc,$28/night and double occupancy,$32/night. If you intend to stay at Tahitian Village,please make reservations with Tahitian Village Manager,Bob Burns,at above address.

COVENTION HOSTS

Names and work telephone numbers of some local personnel who will be available to help you find your way around,if you plan to attend the 1981 NSA Downey Convention and may require such aid,include:

Hal Norris	(213)	594-3289
Dick Long	(213)	594-3974
George Frey	(213)	594-3901
Mark Weissman	(213)	594-3901
Alan LeFever	(213)	594-2976

CONVENTION SCHEDULE

Friday,August 14,th
DEI Room,Rockwell International Downey Facility

9.00A.M.--11A.M.:Registration
9.30 A.M. Opening of Convention - Prof. Frank Meyer
10.00 A.M. Session I: Dr. Rainer Huck,Chairman
-11.50A.M. Presentation of Papers about the Reciprocal System
12 Noon Lunch

1.00P.M. Rockwell Public Relations Welcoming Speaker
Shuttle Program and Future Projections
2.00 P.M.-Session II: Dr. Rainer Huck,Chairman
Presentation of papers about the Reciprocal System
-5.00P.M.

6.00P.M. NSA Annual Dinner,Social Hour with no-host bar
Kona kai Room,Tahitian Village Motel
7.00P.M. Dinner
8.00P.M. Dewey B.Larson : Principal Address
"Renaissance in the Physical Sciences"

Saturday,August 15
DEI Room, Rockwell International Downey Facility
9.00A.M.-11.50A.M. Session III: Dr. Rainer Huck,Chairman
Presentation of Papers about the Reciprocal System
Noon Lunch

1.00P.M.-5.00P.M. or sooner
NSA.INC. Annual Business Meeting
Officer and Committee Reports
Elections.

Dewey B. Larson
755 N.E. Royal Court
Portland, Oregon 97232

May 5, 1981

The attached letter replying to a series of questions from Homer Ballard may be of some general interest. These inquiries were prompted by a news item reporting "direct and unambiguous evidence" of speeds greater than that of light in the quasar 3C 273. Ballard's questions were as follows:

a. On the basis of your theory, what would happen physically to an object such as a spaceship if it were to exceed the velocity of light. Would its occupants survive?

b. Assuming that the occupants of a superlight spaceship did survive the transition, what would the physical effect of return to sublight speeds be?

c. You have stated that antimatter (your "C matter") will probably not be used as a fuel in future spaceships because of our inability to keep it together in a space location, however it has apparently been produced and collected for several days in storage rings for colliding beam experiments. How do you explain this?

d. Assuming "C matter" could not be collected, what form of matter might serve as a fuel for superlight propulsion? You state that matter in old galaxies reaches a point in ageing where it explodes driving some of the galactic mass above light velocity. Would this form of matter serve? What is it?

e. I believe that you have stated in one of your publications that the idea of superlight drives and so called "space warps" is unlikely to become reality, yet your theory does predict the possibility of superlight communication via gravitational, electromagnetic and static-electrical physical vibrations, does it not? If superluminal communication is possible and everything ultimately can be converted into information, then it would seem that eventually we may be able to reduce a physical object to information and communicate it whereever we desire on an appropriate superluminal vibration. What are your thoughts on this?

Dewey B. Larson
755 N.E. Royal Court
Portland, Oregon 97232

May 5, 1981

Mr. W. Homer Ballard, Jr.
1108 Pleasant Dale Ave.
Colonial Heights, Va. 23834

Dear Mr. Ballard:

Since I am a science fiction fan myself, and enjoy reading about space travel, exotic energy sources, etc., I do not like to have to throw cold water on the possibility that some of these things might be brought within the realm of reality. Unfortunately, however, the picture that emerges from the development of the concept of a universe of motion has no place for these products of the imagination. Nor can it accommodate the equally imaginative products of the modern astronomer, such as the black holes and the big bang. Perhaps this makes the universe rather dull, but we have to take it as it comes.

Speeds greater than that of light are possible in that universe, to be sure, but it is not possible to change position <u>in space</u> at a rate exceeding the speed of light. The higher speeds result in a change of position in time. Consequently, they are of no use to the would-be space traveler. The "superluminal" speeds reported in the article in <u>Science News</u> are fictitious. They are based on the cosmological hypothesis as to the location of the quasars, which greatly overstates the distance. The actual distance of 3C 273, according to my calculations, is close to the 0.0031 distance of M 87, the giant galaxy from which it was probably ejected, rather than the 0.158 "cosmological" distance assumed for purposes of the astronomers' speed calculation. Whan the 9.6 c speed is reduced by this ratio, it becomes 0.19 c, or about 5600 km/s, which is fast, but not remarkable.

Answering your last question first, the theory does not allow communication at a speed exceeding that of light <u>in space</u>, nor does it allow communication at a speed less than that of light in time. It follows that neither sector can utilize the speeds of the other for communication purposes. The answers to your other questions follow:

a. The <u>matter</u> of which the occupants are composed would survive, providing that the internal speeds within the ship (the temperatures) remained low. But life processes could not survive the required acceleration.

b. If the effects of the acceleration could be avoided, there would be no adverse result from the high speed of the ship. The critical speeds are the internal speeds. There is nothing to prevent a low temperature aggregate from moving at a high speed.

c. Some sub-atomic particles of the inverse (cosmic) type have a degree of stability in the material environment, and <u>any</u> cosmic particle or atom is stable at the speed of light. As I pointed out in NBM, the true nature of

the "antiparticles" produced in the accelerators is still uncertain. In any event, the experimental results show that contact of these particles with their "anti" forms does not result in the annihilation required by the antimatter hypothesis, except in the one case of the electron and the positron.

d. It is not possible to reach speeds in excess of that of light by any kind of a "propulsion" process; that is, one in which the speed is added incrementally. Fractional units do not exist in the universe of motion. Speeds less than unity (the speed of light) are therefore possible only by utilizing units of the inverse quantity to modify one speed unit. The resulting speed is 1-(1/n), where n is the number of units of inverse speed, which I have identified as energy, t/s, or speed of a mass, $mv^2 = t^3/s^3 \times s^2/t^2 = t/s$. As you can see, the net speed, 1-(1/n) never exceeds 1, no matter how many units of n are applied. In order to reach speeds above unity, a full speed unit must be applied, increasing 1-(1/n) to 2-(1/n). The only process energetic enough for this purpose, so far as I have been able to determine, is an extremely violent explosion. It follows that speeds in excess of that of light, originating in the material sector, are confined to the products of explosions of large astronomical objects: stars or aggregates of stars.

Sincerely yours,

D. B. Larson

A NOTE by R.W.SATZ on Prof. K.V.K. NEHRU'S COMMENTS

I am delighted that Prof. Nehru made such a careful study of my paper "Further Mathematics of the Reciprocal System". Typographical errors are a source of vexation to both authors and readers. All of those cited except for that in comment 1.8 were the responsibility of the Reciprocity staff. As for comment 2.1, R was defined in Eq.(14) in manuscript,but left out in the printed version. The queries in comments 2.2 and 2.4 can be answered by reference either to Structure or to the second volume of the revised edition(I referenced implicitly all of Larson's books at the beginning of the paper,giving only one,NBM,explicitly).The new notation for atoms and intermediate particles makes clear the 5 rotations taking place. I now think that the total speed notation for the neutron should be $\frac{1}{3} - \frac{1}{3} \searrow$
$2 - 2 \rightarrow 1$
As for comment 3.1,the cosmic radiation,like our radiation,covers the entire spectrum of wavelengths but in reverse order(p.204,Structure); photons,whether of high or low frequency,are stationary in space-time and thus Eq.(18) and its cosmic equivalent apply to all frequencies. The last comment(3.2) is accepted,even though it means that sub-atoms would be "perceived" as being larger than atoms;all particles(photons, sub-atoms,or atoms,whether material or cosmic, are natural unit of space (or time) in diameter,reduced by the appropriate interregional ratio.

Some Myths of Modern Physics

FRANK H. MEYER and RONALD W. SATZ

ABSTRACT-Questions are raised as to four principles of modern physics, solar fusion, the nuclear atom, light as a measure of maximum speed and gravitational collapse through the argument that a single contradiction between the theory and fact is enough to discredit any fashionable theory, no matter how mathematical and popular.

Questions for physicists and physics teachers as to myths in contemporary thought within our discipline may be raised, identified and distinguished from physical truth by findings which the authors of this report have drawn from both classical and modern writings, particularly from the work of D.B.Larson of seeing the world as a whole. (Larson, 1959 and 1979). Our concern focuses on four myths of contemporary physics:

MYTH of solar fusion MYTH of the nuclear atom
MYTH of "nothing faster than light" MYTH of gravitational collapse

Myth-making is an old human custom and entertainment. Physicists have not been immunized from it.

Some additional examples of modern myth-making are; the 4-dimensional infinitely divisible space-time continuum; the quark; the neutron star; and the black hole, etc.

Myths of modern physics, being of scientific rather than religious foundation, are more subtle than popular myths of the past.

Hardly anyone in the U.S.A. or U.S.S.R. believes that the sun and moon are a god and goddess. Probably no academician alive believes, as once Plato did, that the planets, Mercury, Venus, Mars, Jupiter and Saturn, are divinities. The Viking gods, Woden and Thor, no longer are widely believed to preside, respectively, over Wednesday and Thursday, not even in Scandinavia.

Myths of modern physics are much more difficult to refute than the myths of the past, because the modern myths are more finely invented and intricately interwoven. The modern scientific myths also are backed by the articulate advocacy of many leading modern scientists-a profession better organized than the priesthood of ancient Greece, Rome, Scandinavia or medieval Europe.

MYTH of solar fusion

The myth of solar fusion is the unfounded theory that the sun's energy derives primarily from the fusion of four hydrogen nuclei to a helium nucleus with neutrino formation as a by-product.

One has only to look into almost any college astronomy textbook, be it Frederick and Baker, 10th Edition(1976); George Abell, 3rd Edition(1975); Pasachoff and Kutner(1978); Or Michael Zelik, Astronomy(1979); to realize that the nuclear fusion model of solar energy generation has had its day. This is because Ray Davis' neutrino experiment has not confirmed the fusion model. It is regrettable that many competent physicists and astronomers accepted the Hans Bethe solar fusion models as proved before the experimental results were in. As recently as 1965, no well-known physicist or astronomer doubted that the sun was emitting copious amounts of neutrinos. They agreed uncritically and complacently that the Bethe models must be correct and the Davis experiment must prove it to be so.
In 1981 the nuclear fusion myth can only be maintained by denying that it matters at all whether the theory can be confirmed experimentally.

More than 20 years ago, D. B. Larson(1959)doubted the solar fusion concept and proposed an alternative radioactive explanation of solar energy generation. From the postulates of his Reciprocal System of theory he has inferred that the energy generation is achieved by the fission of the heavy elements instead of fusion of the light elements in the sun.

The Larson fission theory of solar energy generation has the merit that it does not require the sun to emit an abundance of neutrinos, as does the fusion theory. Fission, neverless, does account for solar energy as well as fusion can and should have been considered equally with fusion as a principal cause of the sun's energy from the beginning. Though by not examining it, no one has either proved or disproved it, this theory has a distinct advantage over the fusion theory of also offering a credible physical explanation of Type I supernova explosions(Larson, 1971).

MYTH of the nuclear atom

The solar fusion myth is a conspicuous by-product of the theory of nuclear physics. The mythical character of the by-product raises a question: How free of myth is nuclear physics itself?

The principal reason why the nuclear atom model, apart from the question of its truth, has remained firmlyin command of physical and chemical research is that it has seemed to work. However, the nuclear atom model seems not to work for explaining how the sun's energy is generated. Thus, the nuclear atom is itself brought into question, because it has failed to work for the important case of solar energy generation.

Besides, analysis of atomic structure in the light of D. B. Larson's (1961)Reciprocal System discloses that the nuclear atom model is, itself, a myth.

No nucleus can be seen in any atom, simply because there is none to be seen, not because the atom and nucleus are too small to be seen.

So-called elementary particles, such as protons, neutrons and electrons, are not included in actual atomic stucture, because an atom is really a unity of discrete motions rather than a system of distinct substances.

The interesting finding of the Reciprocal System is that matter presupposes light. Matter is a form of motion, specifically a superposition of discrete motions, rotational motions, upon the vibrational and translational motions of one or two photons of light.

Shrader-Frechette(1977) in an extended review of the nuclear atom concluded that there is no more evidence that an atom is composed of elementary particles than that it is not.

MYTH of nothing faster than light

It is evidently true that no material object moves faster than 186,000 miles/second. It is not true that material objects are the only physical objects to be found in the physical universe.

The material sector is one-half of the physical universe, not the whole of it. Larson(1959 and 1979) refers to the other half as the cosmic sector, because the principal evidence for its existence is found in the existence of cosmic radiation.

The cosmic sector contains as many kinds of physical objects as does the material sector. A cosmic object can be identified and distinguished from a material object by the fact that it can only exist as such by having a finite rate of motion exceeding 186,000 miles/second.

Hence it is a myth that 186,000 miles/second is the maximum speed allowable in the physical universe

The absolute constancy and isotropy of the 186,000miles/second speed in empty space-time should have alerted physicists before now to the fact

that this cannot be the characteristic speed of a particle of light. Photons are peculiar immaterial physical objects in that they have two speeds, two rates of motion-a translation rate and a vibration rate, called frequency. What distinguishes one photon from another is frequency. A photon is a compound motion, which explains why it behaves as particle and wave. The speed which photons have in common is the speed of the specific space-time location in which each photon originates. Larson calls this speed of light the unit speed of the space-time progression at the uniform clock rate of one unit of space per one time unit. The postulated discreteness of the space-time continuum is due to Larson's discovery(1959 and1979)that neither space nor time is infinitely divisible and that they are reciprocally related as motion.

It is because space and time are the reciprocals of each other, that for every physical entity or phenomena, there is an inverse, which is identical in all respects except that space and time are are interchanged. For instance, for every material chemical element in the Periodical Table, its inverse exists in the form of a chemical element. this inverse is not an additive inverse(+ and $^-$), which is a reason why Larson prefers to use not the term "anti-matter"(Alfven Hannes, 1966), to characterize the cosmic elements and particles. Material element and/or its cosmic element opposite are related as multiplicative inverses(x and /).

Unit speed, (the speed of light), is neither a maximum nor minimum (speed) finite physical. Its true physical signifiance, according to the Reciprocal System, is twofold. Unit speed is the uniform scalar rate of progression of empty and photon-filled space-time locations. As such it is the natural, preferred inertial frame of reference, in which all physical measurement is most appropriately and simply performed. The mathematical number unity rather than zero is the true physical zero.

MYTH of gravitational collapse

Gravitational collapse is a scientific notion much employed by astrophysicists to explain a diversity of astronomical objects. The notion first was invoked to explain the ultradensity of the white dwarf stars. More extravagant forms of gravitational collapse, the neutron star and the black hole, are used to explain the ultradensity of stars even more dense than the white dwarf-the pulsar(Manchester, Taylor, 1977).

Gravitational collapse is a scientific myth because it is built upon three propositions each now known to be contrary to fact. These questionable premises about gravitation and space-time are:

Gravitational force is the only universal force.
Space-time is an infinitely divisible continuum.
Gravitation always behaves as an attractive force.

If gravitational force were the only universal force, the large-scale structure of the physical univese would have a center at which the spacial density of the stars and galaxies would be a maximum. Proceeding outwards from this putative center, the spacial density should continuously decrease until finally at great distances it should be replaced by an infinite void.

In fact, the physical universe is not so constructed. If the physical universe has a center, it is everywhere and anytime, as Comenius(1658)proposed.

In fact, the space-time continuum is interrupted by finitely divisible units of space and time. In fact, motion is a reciprocal relation between space and time. More space and less time mean faster motion. Less space ~~space~~ and more time mean slower motion.

As a consequence of the discrete and reciprocal character of space and time, gravitational force manifests a repulsive side inside a natural

unit of space($s_p = 0.45 \times 10^{-5}$ cm.) as well as the familiar attractive side outside the discrete space unit. Gravitational motion is naturally always a scalar motion always tending towards unity.

The space-time progression is naturally always a scalar motion always tending away from unity. Outside a natural unit of space, the space-time progression moves things apart and is the cause of expansion(Hubble, 1936) and the openness(Pasachoff) of the physical universe. However, inside a unit of space, away from unity results in bringing physical objects closer to each other im space. Consequently, in the motion of solid cohesion the force of space-time progression plays the role of the attractive force.

Hence even in the solid phase of matter gravitational collapse can NOT be made to occur; atoms in solids have not been made to touch each other under maximum compression. Solid matter is a stable equilibrium product, a stable equilibrium between the attractive space-time progression force and the repulsive gravitational force.

When gravitational collapse is not found in the solid phase, it is not to be expected in the fluid phases of stellar and galactic matter. In short, gravitational collapse is a myth. Hence a different explanation must be sought for the ultradensity of certain astronomical compact objects, such as white dwarfs, pulsars, quasars, etc. *

REFERENCES

ABELL, GEORGE. Exploration of the Universe. Third Edition, Holt, Rhinehart and Winston. 1975.
ALFVEN, HANNES. Worlds-Antiworlds. W.H. Freeman and Company. 1966.
COMENIUS, J.A. On Learned Ignorance. 1658.
FREDERICK, L.W. and BAKER, R.H. Astronomy, Tenth Edition, D. VanNostrand Company, 1976.
HUBBLE, E. Realm of the Nebula. Yale University Press. 1936.
LARSON, D.B. The Structure of the Physical Universe. North Pacific - - Publishers. 1939.
-----Nothing But Motion. North Pacific Publishers. 1979.
-----Quasars and Pulsars. North Pacific Publishers. 1971.
-----The Case Against the Nuclear Atom. North Pacific Publishers. 1961.
MANCHESTER, R.N. and TAYLOR, J.H. Pulsars. W.H. Freeman and Company. 1977.
PASACHOFF, J.M. and KUTNER, MARC L. University Astronomy. First Ed. 1978
-----Popular Open Universe. Science News. Vol117, 1980.
SHRADER-FRECHETT, K. Philosophy of Science 44, September, 1977.
ZELIK, MICHAEL. Astronomy. Second Edition. 1979.

* For "a different explanation" see article, "THE DENSITY GRADIENT IN WHITE DWARF STARS" by D.B. LARSON printed in this issue of RECIPROCITY.

THE DENSITY GRADIENT IN WHITE DWARF STARS

In connection with assembling the material for a new edition of the 1959 book in which I introduced the theory of a universe composed entirely of motion, I am reviewing the progress that has been made in the intervening 22 years, both in the development of the details of the theory itself and in the fields of observation and experiment, to make certain that the new work has the benefit of these advances. One item that came to my attention during this review is particularly important because it supplies a positive verification of the theoretical findings as to the structure and density of the white dwarf stars, a result that has far-reaching implications.

In order to appreciate the significance of the observed facts in relation to the theory, it is necessary to understand the general nature of the motion of which the theoretical universe of motion is composed. The most important direct consequence of the postulates that define this universe is the existence of a general reciprocal relation of a scalar nature between space and time. By reason of this reciprocal relationship, motion in such a universe can take place either on the basis of a space-time ratio of 1/n, a speed less than unity (which we can identify as the speed of light), in which case the change of position takes place in space, or on the basis of a space-time ratio of n/1, a speed greater than unity, in which case the change of position takes place in time. The first of these alternatives is the prevailing motion in our immediate environment. What I have shown in my previous publications is that the extremely compact astronomical objects discovered in recent years -- white dwarf stars,

pulsars, quasars, etc. -- are aggregates whose components are moving at greater-than-unit speeds.

Of course, the idea of speeds in excess of the speed of light conflicts with Einstein's dictum that such speeds are impossible, but to err is human, and Einstein is no exception. As usually happens in such cases, the error stems from the use of an invalid assumption. In his book The Character of Physical Law, Richard Feynman points out that when we put all of our presumed knowledge together, "we get inconsistency, because we get infinity for various things when we calculate them, and if we get infinity how can we ever say that this agrees with nature?" Feynman attributes this inconsistency to the use of "a number of tacit assumptions...about which we are too prejudiced to understand the real significance". What Einstein apparently did not realize is that one of the assumptions on which he based his conclusions violates a universal law: the Law of Diminishing Returns.

Strangely enough, this law, generally recognized in most other fields of thought, is practically ignored in science. But we cannot repeal a law of nature by ignoring it. This is the law that prohibits the infinities that Feynman deplores. It tells us that the ratio of the output of any physical process (such as the acceleration of a mass) to the input (in this case, the applied force) does not remain constant indefinitely, but eventually decreases, and ultimately reaches zero.

So the relation expressed in Newton's Second Law of Motion, F = ma, cannot remain constant. Recognition of this fact leads to an interpretation of the experimental results that is quite different from Einstein's. Instead of his

conclusion that it is impossible to exceed the speed of light (which follows if, as he assumed, the relation F = ma remains constant), the correct interpretation is that it is impossible to accelerate a mass to a speed greater than that of light by means of an electrical force. In other words, the limitation is not on the speed, but on the capabilities of the process. The significance of this is that it does not preclude acceleration to higher speeds by other means, such as the sudden release of large quantities of energy in violent explosions.

One of the reasons why Einstein's interpretation of the observed facts has been so widely accepted in spite of its unsound foundation involves another of the "tacit assumptions" mentioned by Feynman. It has been assumed that a speed in excess of that of light would result in a corresponding increase in the rate of change of spatial position. The absence of any observed changes of position at higher rates (except for some observations of quasar components, whose true significance is still in doubt) has therefore been regarded as a confirmation of Einstein's conclusion. But here again, the conclusion that has been drawn goes beyond the evidence, which applies only to the rate of change of position in space, and has relevance to the speed only insofar as the change of position due to the motion takes place in space. In the universe of motion, the change of position is in space if the space-time ratio (speed) is 1/n. It is thus impossible for a change of position in space to take place at a rate (speed) in excess of unity (the speed of light), because the limiting value of the quantity 1/n is 1/1. But this does not mean that higher speeds are impossible; it merely means that motion at higher speeds, with space-time ratio n/1,

is motion in time rather than motion in space.

According to the theory of a universe of motion, the neutral condition is motion at unit speed, and the motions of the universe as a whole are symmetrical around this level, the true speed magnitude in each case being the deviation from unity. As a result of the space-time symmetry, the effect of any motion in time is the inverse of the effect of the corresponding motion in space. The particular motion with which we are concerned at the moment is the motion imparted to the products of the explosion of a star: a supernova. Some of the products of such an explosion are ejected at speeds less than that of light, and they take the form of a cloud of particles moving outward in space from the site of the explosion, but remaining in the original location (the moving location indicated by a clock) in time. Another portion of the explosion products is accelerated to speeds greater than that of light. These products take the form of a cloud of particles expanding into three-dimensional time, but remaining in the original location in space. This cloud of particles is the white dwarf star.

As I have shown in my publications, a development of the details of the properties and the evolutionary course of the white dwarfs on this theoretical basis leads to results that are in full accord with the observations. For present purposes, however, we are concerned only with the density relations. The expansion of the (relatively) slow-moving explosion products into space results in a large <u>decrease</u> in the density of the expanding aggregate. Because of the reciprocal relation between space and time, the expansion of the fast-moving product into time results in a large <u>increase</u> in the density of this

aggregate. The white dwarf star is therefore an object of abnormally high density, compared to a normal star. Furthermore, the density gradient is the inverse of that which prevails in the normal stars; that is, the center of the white dwarf is the region of greatest compression in time (equivalent to expansion in space), and it is therefore the region of minimum density.

This picture of the white dwarf derived from the theory of a universe of motion is, of course, quite different from the currently popular view, and it is possible that many individuals will find it little short of outrageous. But the reason for writing this article is that in the course of my review of the progress in the white dwarf field that has taken place in recent years, it became evident that some of the information about these objects that is now available supplies a positive confirmation of the upside down nature of the white dwarf structure.

As pointed out by James Liebert in a review article in the 1980 Annual Review of Astronomy and Astrophysics, it is generally conceded that the apparently normal matter in the outside layers (atmosphere) of the white dwarf stars must have been accreted from the environment. (The development of the theory of a universe of motion arrives at the same conclusion.) This matter, then, is mainly a mixture of hydrogen and helium, with hydrogen as the major constituent. If conventional theory is correct, the heavier element, helium, will preferentially move downward, leaving the outer layers of the star enriched in hydrogen. On the other hand, if the inverse density gradient required by the theory of a universe of motion actually exists, the hydrogen will preferentially move downward, and the outer layers will be enriched in helium. The

verdict from observation is unequivocally in favor of the universe of motion. Liebert reports that the "cooler helium-rich stars" are "the most numerous kind of white dwarf", and that some have almost pure helium atmospheres. "The existence of nearly pure helium atmosphere degenerates over a wide range of temperatures has long been a puzzle", he says. But it need not continue to be a puzzle. The helium accumulates in the outer layers because these are the regions of greatest density in the white dwarf.

This theoretical conclusion, strange as it may seem in the light of current thought, is further confirmed by an examination of the behavior of the elements heavier than helium, commonly lumped together as "metals" in discussions of stellar composition. The metals, too, should preferentially accumulate in the regions of greatest density: the center of the star, according to current astronomical theory; the outer layers, according to the theory of a universe of motion. Liebert describes the observed situation in this manner:

> The metals in the accreted material should diffuse downward, while hydrogen should remain in the convective layer. Thus the predicted metals-to-hydrogen ratio would be <u>at or below solar</u> (interstellar) values, yet real DF-DC-DK stars have calcium-to-hydrogen abundance ratios ranging from about solar to well above solar.

Here again, as in the helium distribution, the verdict is unequivocal. The larger concentration of the heavier elements in the outer regions definitely identifies these as the regions of greatest density, a result that is inexplicable on the basis of conventional theory, but is specifically required by the theory of a universe of motion. Liebert admits that no plausible

explanation on the basis of current astronomical theory is known. The only suggestion that he mentions is that the accretion of hydrogen must be blocked by some kind of a mechanism, a far-fetched idea without the least support from observation.

When it is viewed in conjunction with the gradual decrease in component speeds that takes place as energy is lost to the environment, the inverse density relation also supplies an explanation of the occurrence of novae. The continued energy losses eventually result in the speeds of some of the constituent particles dropping below the unit level, and into the region of motion in space. These particles then occupy more space because of their spatial speed, and they form "bubbles" that move to the region of least density, the center of the star. Accumulation of this material with high spatial speeds builds up a gas pressure. Eventually the pressure reaches a level at which it breaks through the overlying matter, resulting in a flare-up of the star, as the hot material from the interior is exposed briefly. The outburst relieves the internal pressure, the star resumes its normal condition, and a new pressure build-up begins.

The explanation of the origin, the extreme density, the novae, and other properties of the white dwarfs that I derived originally by deduction from the properties of space and time as they exist in a universe composed entirely of motion requires some significant conceptual reorientation, and most astronomers have been reluctant to entertain the possibility that current ideas may have to be altered to such an extent. However, more and more of those who examine the existing problems carefully are recognizing that <u>something</u> will have to undergo

a drastic change, and are assessing the situation in a manner similar to the following from Martin Harwit:

> The fundamental nature of astrophysical discoveries being made -- or remaining to be made -- leaves little room for doubt but that a large part of current theory will have to be drastically revised over the next decades. Much of what is known today must be regarded as tentative and all parts of the field have to be viewed with healthy skepticism. (Astrophysical Concepts, Wiley, New York, 1973, page 9)

The big problem, of course, is to determine just what has to be changed, and what to put in its place. The inverse density gradient that we find in the white dwarfs now identifies one of the requirements that must be met by the "drastically revised" theory. It must provide a new explanation of the white dwarf structure that incorporates this upside down density relation. Perhaps there are alternative ways in which this requirement can be met, but it seems rather obvious that the first step in exploring the situation ought to be to take a good look at the theory already in existence that anticipated this requirement.

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